Modularity impacts cellulose surface oxidation by a lytic polysaccharide monooxygenase from *Streptomyces coelicolor*

Olanrewaju Raji[1*], Vincent G.H. Eijsink[2], Emma Master[1,3], and Zarah Forsberg[2*]

[1] Department of Chemical Engineering and Applied Chemistry, University of Toronto, 200 College Street, Toronto, Ontario, M5S 3E5, Canada.

[2]Faculty of Chemistry, Biotechnology and Food Science, NMBU - Norwegian University of Life Sciences, 1432 Ås, Norway

[3]Department of Bioproducts and Biosystems, Aalto University, Kemistintie 1, 02150 Espoo, Finland.

*Corresponding authors:

Olanrewaju Raji - Department of Chemical Engineering and Applied Chemistry, University of Toronto, 200 College Street, Toronto, Ontario, M5S 3E5, Canada. Tel: +1 6785108673. E-mail: olan.raji@utoronto.ca
&
Zarah Forsberg - Faculty of Chemistry, Biotechnology and Food Science, NMBU - Norwegian University of Life Sciences, 1432 Ås, Norway. Tel: +47 67232469. E-mail: zarah.forsberg@nmbu.no

SUPPLEMENATRY INFORMATION

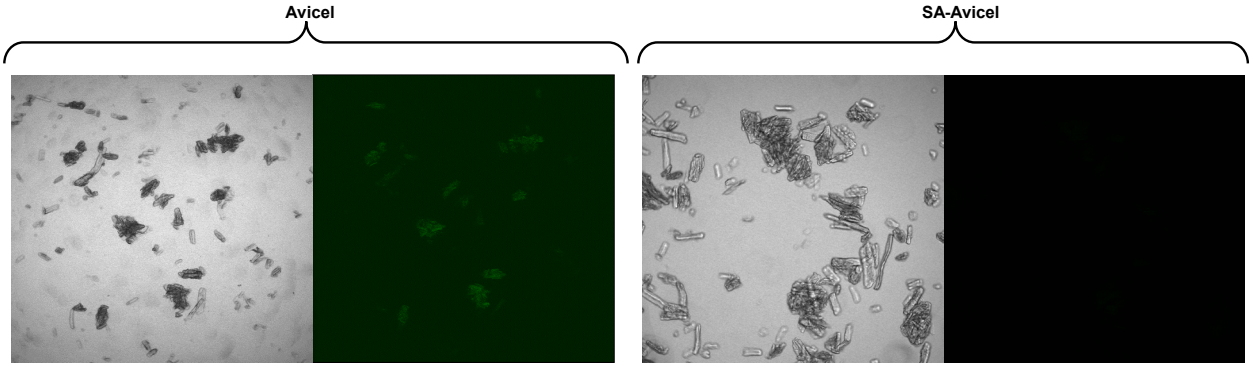

Figure S1. Fluorescent labeling of untreated and sulphanilic acid treated Avicel. 10 g/L Avicel or SA-Avicel was labeled with fluorescent dye and visualized using a confocal microscope with 480 nm excitation and 520 nm emission wavelengths.

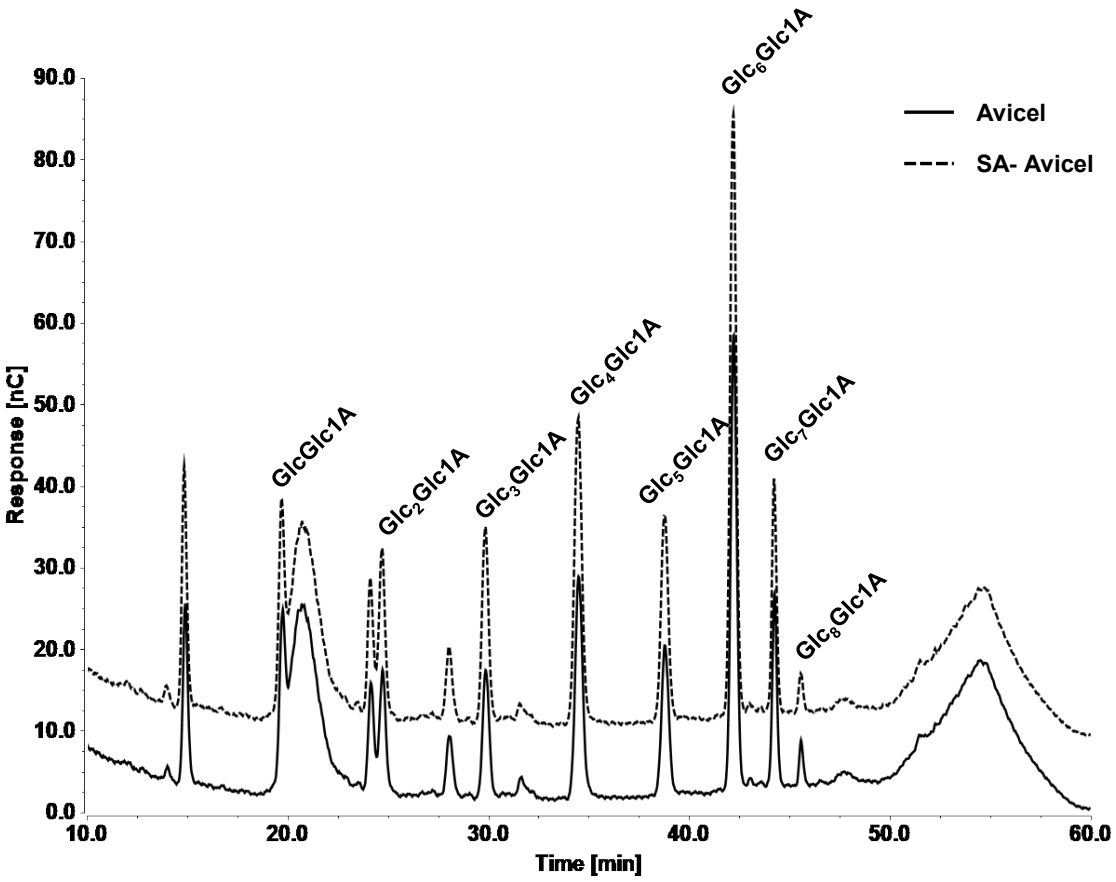

Figure S2. HPAEC-PAD analysis of LPMO activity on Avicel and SA-Avicel. The chromatograms show native and oxidized soluble products generated upon treating Avicel or SA-Avicel with *Sc*LPMO10C. The activity assays were conducted using 5 µM of *Sc*LPMO10C, 10 g/L Avicel or SA-Avicel and 1 mM ascorbic acid in 50 mM sodium phosphate pH 6.0; the reactions were incubated for 24 h at 40 °C, with shaking at 1000 rpm, after which soluble products were analyzed by HPAEC-PAD.

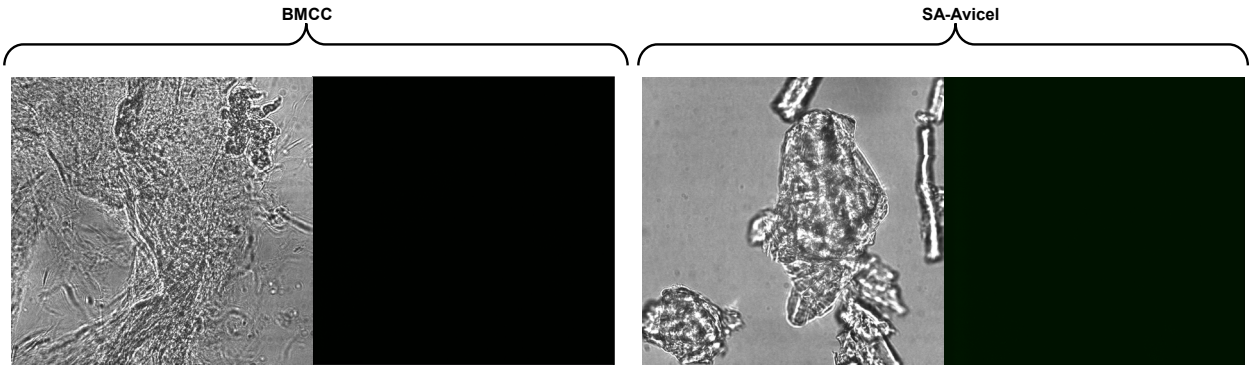

Figure S3. Fluorescent labeling of non-LPMO treated BMCC and SA-Avicel. 3 g/L BMCC or 10 g/L SA-Avicel was incubated in 50 mM sodium phosphate buffer (pH 6.0) at 40 °C with 1 mM of gallic acid, with 800 rpm orbital shaking for 24 h. Insoluble products were collected by centrifugation, labeled with the fluorescent dye, and visualized using a confocal microscope with 480 nm excitation and 520 nm emission wavelengths.

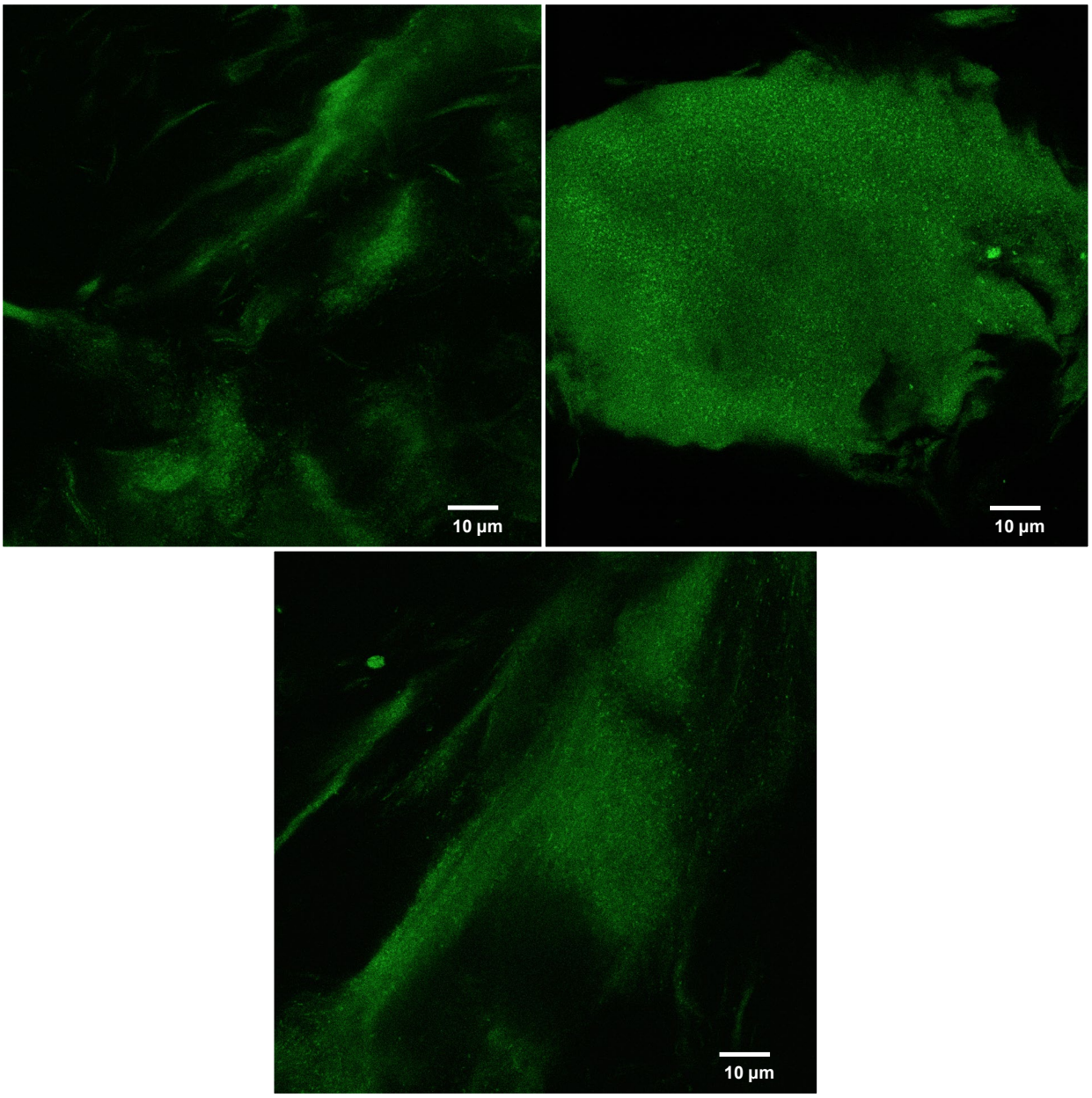

Figure S4. Additional images of fluorescently labeled *Sc*AA10-treated BMCC. 3 g/L BMCC was incubated in 50 mM sodium phosphate buffer (pH 6.0) at 40 °C with 1 µM LPMO *Sc*AA10 and 1 mM of gallic acid, with 800 rpm orbital shaking for 24 h. Insoluble products were collected by centrifugation, labeled with the fluorescent dye, and visualized using a confocal microscope with 480 nm excitation and 520 nm emission wavelengths.

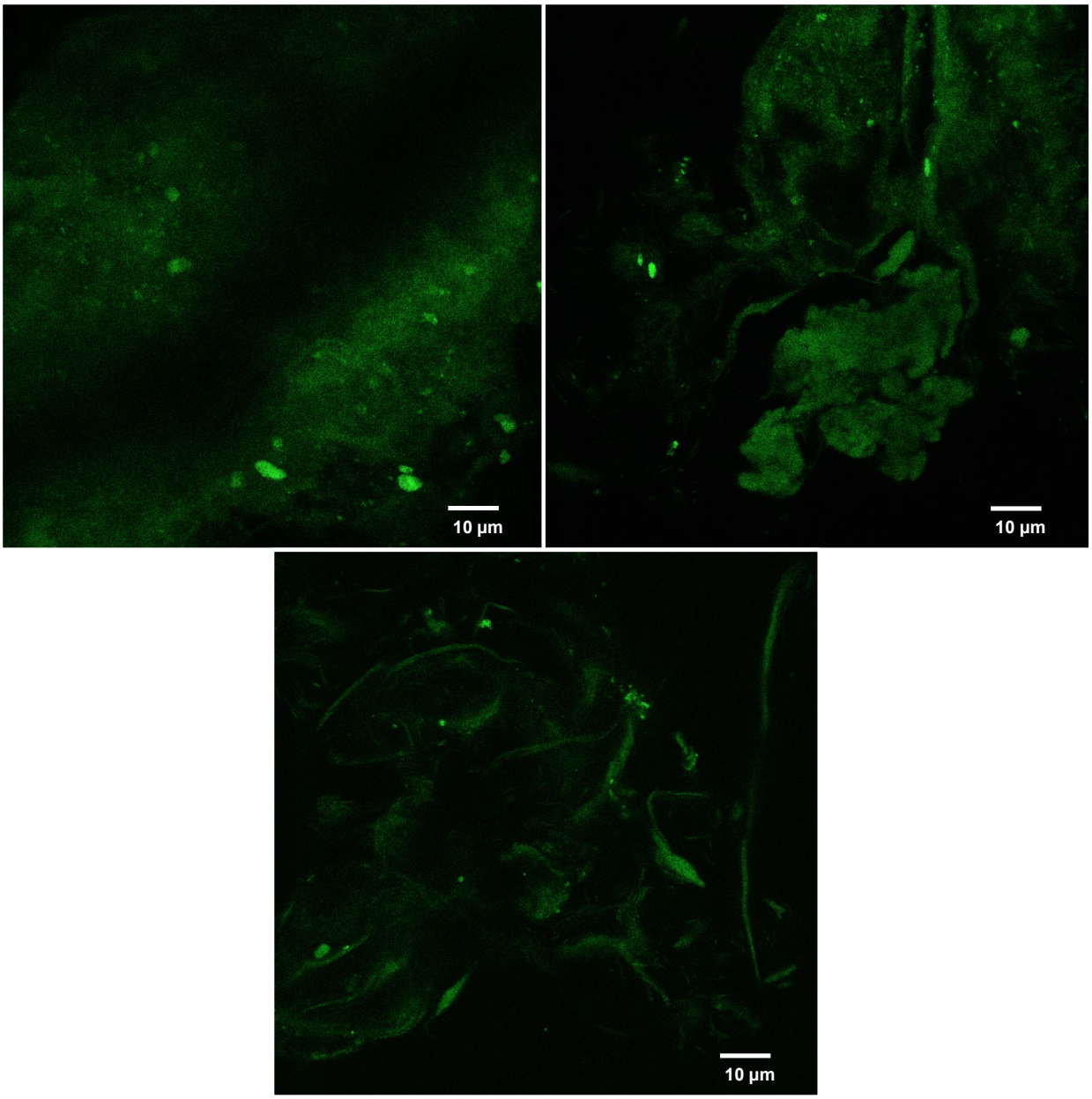

Figure S5. Additional images of fluorescently labeled *Sc*LPMO10C-treated BMCC. 3 g/L BMCC was incubated in 50 mM sodium phosphate buffer (pH 6.0) at 40 °C with 1 µM LPMO *Sc*LPMO10C and 1 mM of gallic acid, with 800 rpm orbital shaking for 24 h. Insoluble products were collected by centrifugation, labeled with the fluorescent dye, and visualized using a confocal microscope with 480 nm excitation and 520 nm emission wavelengths.

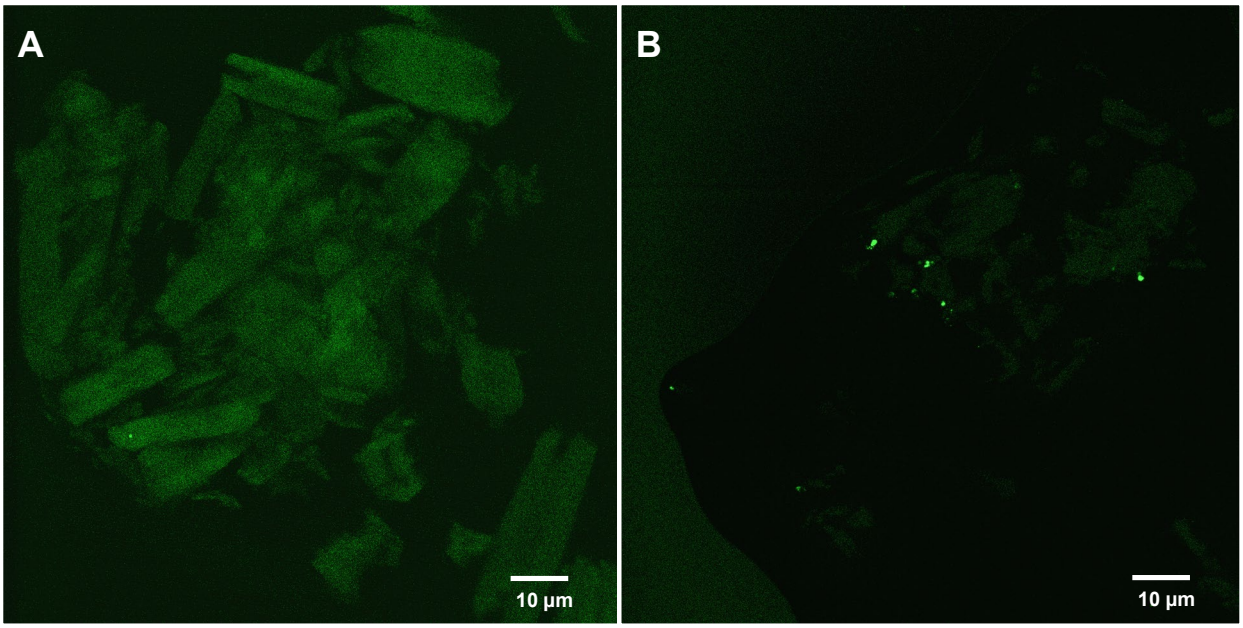

Figure S6. Additional images of fluorescently labeled LPMO-treated SA-Avicel. 10 g/L SA-Avicel was incubated in 50 mM sodium phosphate buffer (pH 6.0) at 40 °C with 1 µM LPMO *Sc*AA10 (A) or *Sc*LPMO10C (B) and 1 mM of gallic acid, with 800 rpm orbital shaking for 24 h. Insoluble products were collected by centrifugation, labeled with the fluorescent dye, and visualized using a confocal microscope with 480 nm excitation and 520 nm emission wavelengths.